

## **8. PROJECT CONSIDERATIONS**

By their very nature, infrastructure projects have major impacts on the community in which they are located. Construction involves traffic, noise, vibrations, dust and heavy machinery. The impact of construction on the community and environment must be considered. This section presents the considerations, proposed easement and land acquisition plan, permits, contractual goals, and operation and maintenance for the Fall Creek/White River Tunnel project.

### **8.1 COMMUNITY OUTREACH AND COORDINATION**

Based on experience with similar projects, the potential social and community impacts are significant and will need to be addressed early and throughout the project. The community will have a keen interest in participating in the process and will actively voice comments and concerns throughout the project. Consensus-building will be critical to the success of outreach efforts conducted by the City of Indianapolis Department of Public Works (DPW) and the Clean Stream Team (CST).

The location of critical structures related to the project such as shafts, as well as the alignment for the tunnel will be of paramount interest to the people living and working in the neighborhoods, political and civic leaders, and activists in the area. Opposition to a shaft location or use of a corridor for a tunnel alignment because of noise, vibration, traffic or 24-hour activity, can adversely affect a project, requiring significant time extensions and an increase in project costs. Although these issues were considered during this Study, direct communication with the public will be necessary throughout design and construction to avoid or mitigate these issues.

Construction of infrastructure projects can temporarily disrupt the community. Residents and businesses need information to inform them of what is being done; when it will be done; how they will be affected; and when it will conclude. Community outreach personnel will provide information, hear concerns and mitigate the construction impacts. There are various ways for the community to stay informed about the project including, but not limited to, the following:

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- ◆ Citizen's Advisory Committee
- ◆ Project Brochures
- ◆ Newsletters and Mailings
- ◆ Advertising
- ◆ Website
- ◆ Neighborhood and Community Group Meetings
- ◆ Video Messages
- ◆ 24-hour construction hotline

Each is discussed in more detail below.

### Citizen's Advisory Committee

With projects of this size, some cities have assembled small advisory committees comprised of the affected citizens of the community. The purpose of these committees is two-fold. The first is to help the project delivery team better understand potential community impacts and provide a sounding board for alternatives. The second is to attend public meetings to assist in consensus building. Typically these committees work in a complimentary fashion to the community outreach program that is being implemented. The citizens involved typically are chosen to represent various constituencies.

### Project Brochures

Project brochures typically are prepared and distributed to neighborhood residents, businesses, community boards, civic associations and local institutions. These brochures describe the scope of the project; provide the sequence of project activities; and give the names and phone numbers of staff and construction personnel who can be called to answer questions and solve problems associated with the construction project.

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### Newsletters and Mailings

Newsletters and mailings can be used to provide project status updates and information. They should be mailed to businesses and residents affected by or adjacent to the Fall Creek/White River Tunnel at critical points during the project.

### Advertising

Advertisements can be placed in the local newspaper, *Indianapolis Star*, and other relevant and local publications to announce meetings and other important information.

### Website

The DPW and/or the U.S Army Corps of Engineers (USACE) website can be used to disseminate information and provide a schedule of events.

### Neighborhood and Community Group Meetings

Meetings are recommended to be conducted to explain the project and answer questions. Prior to commencement of construction, the community should be invited to a meeting where the details of the project and schedule are presented and the community can meet the project staff. The community has the opportunity to raise any issues or problems at this meeting that can be addressed early in the project. Regular construction meetings also should be conducted for impacted neighborhoods.

### Video Messages

DPW should consider providing a short video to ensure a consistent message is delivered to the public and permitting agencies. This has been found to be very effective in sharing information widely. It also allows the hosts of the public meeting to focus on providing progress updates and prepare for question-answer sessions.

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Usually videos and brochures are part of a wider public communication plan developed by specialists working with the project team.

### 24-Hour Construction Hotline

A 24-hour construction hotline should be maintained as a quick and effective means to contact or report any construction-related issues.

#### **8.1.1 Traffic**

Traffic impacts related to tunnel construction typically are associated with four activities:

- ◆ Mobilization and demobilization of equipment from the work area
- ◆ Shift changes
- ◆ Tunnel muck/spoils hauling
- ◆ Concrete lining operations

Truck traffic will be the greatest at the working shaft site. Mobilization and demobilization of equipment are limited to the start and end of the project or a particular activity and are not anticipated to significantly impact traffic. Shift changes will produce noticeable traffic impacts when private vehicles transporting workers come and go from each site over a short duration of time. Assuming each construction crew and their accompanying project representatives consist of 50 to 60 people, 100 vehicles can be expected for a shift change (arriving and leaving) at the working shaft or main tunnel. As previously discussed, 120 trucks hauling muck can be expected if the tunnel advances at a rate of 50 feet per day. Over a ten hour day, this equates to 12 trucks hauling muck per hour. If higher tunnel advance rates are achieved, more trucks hauling muck will be necessary. Therefore, it is preferable that the working shaft site be accessible to trucking routes and highways to limit the community impact. In addition, disruptions in traffic are lessened by locating working shaft sites in industrial districts.

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To a lesser extent, the same traffic impacts can be expected at working shafts for any soft ground tunnel and at drop shafts, particularly where connection tunnel construction will take place.

In addition to project site traffic, the Fall Creek/White River Tunnel has been sited and designed to minimize traffic disruptions. There may be locations where traffic will require re-routing or scheduled closures will be necessary. The goal during design is to keep access open and traffic moving, especially in sensitive areas. The following criteria will be considered during the design of the Fall Creek/White River Tunnel.

- ◆ Maintain access to business
- ◆ Work with businesses to arrange alternate access
- ◆ Post detour signs to help customers access businesses during construction
- ◆ Provide off-site parking for construction workers to preserve on-street parking

### **8.1.2 Noise**

Noise generated from construction activities will be subject to the City of Indianapolis' (City) regulations. All of the work, except for the excavation and lining of the main tunnel, can be completed economically during normal working hours. Due to the expense associated with the tunnel boring machine (TBM) and the schedule requirements for excavating and lining the main tunnel, 24-hour operation of the TBM and concrete lining activities typically is permitted. Since the excavation activities and water and muck handling occur underground, the amount of noise associated with these activities is limited. During the night shift, concrete lining activities can be limited to moving concrete forms underground. Night shift personnel, vehicles, and equipment supporting these underground activities will be required at the working shaft, which will generate some noise. The noise typically is associated with:

- ◆ Muck stockpile handling
- ◆ Crane operation to support the mining activities
- ◆ Ventilation fans

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All operations not immediately essential to support tunnel mining, such as muck hauling to the disposal site, can be conducted during normal working hours or at least minimized during the most sensitive hours. In addition, blasting for shaft construction will generate noise. The public impact can be limited by constructing noise barriers and implementing working hour restrictions on construction activity, if necessary.

Most noise sources can be mitigated to acceptable levels by constructing noise barriers and using silencing devices on the equipment to reduce emissions. The level of noise mitigation necessary will depend on the facilities and communities surrounding the activity. During design, nearby receptors should be identified so noise mitigation measures can be evaluated and selected to reduce the impacts of noise on adjacent properties. Ambient noise levels should be determined during design at the working areas. The background data should be compared to noise data collected during construction. The effectiveness of the noise mitigation measures should be determined and, if required, controls should be added.

### **8.1.3 Lighting**

The working shaft site will require lighting to facilitate the 24-hour tunnel construction operation. Locating the working shaft in an industrial district away from residential areas and preventing light trespass may reduce the impact to the public. On-site lighting should be placed so as not to shine on adjacent properties or cause glare. The use of lights in areas where work will not be conducted during a particular shift should be minimized.

## **8.2 WETLANDS AND FLOODPLAIN AREAS**

Several project components, including access shafts, drop shafts, force mains and outfall structure(s) may be located in wetland areas. Prior to commencement of construction, a wetlands survey should be completed and the results should be verified by the USACE. If the USACE verifies the presence of jurisdictional wetlands, the City must obtain a permit to comply with the provisions of Section 404 of the

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Clean Water Act. Since the project components are likely to be sited within the floodplains of the Fall Creek and White River, all project work should be coordinated with the City of Indianapolis/Marion County Floodplain Administrator.

### **8.3 PARKS, GREENWAYS, AND HISTORIC STRUCTURES**

It is very likely that during the construction of the working shaft(s), drop shafts, force mains, and outfall structures, areas such as parks, greenways and historic structures may be disturbed. Such areas are highly valued by the community and local neighborhoods and there is expected to be interest in their participation in the process. It is important to allow local neighborhoods, political and civic leaders, and activists to have an active role in the planning process so they know when and how the activities will take place and what the goal is at the end of the project. These potential disturbances should be identified in project brochures, newsletters, and should be discussed with citizen's advisory groups.

### **8.4 ODOR CONTROL FACILITIES**

The process of dropping combined sewer overflows (CSOs) from the near-surface collection system to the main tunnel will entrain air. To prevent a reduction in the tunnel's hydraulic capacity and transient releases of high pressure air from the drop shafts, a venting system should be installed. The vented air will likely require treatment to reduce odors. Most of the drop shafts for the tunnel system are located in sensitive areas, such as parks and residential areas. Therefore, odor control facilities will be required at some or all locations, and will require more detailed evaluations during future design phases of the project.



**Active Ventilation of Drop Shaft  
using an Activated Carbon  
System**

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Two main approaches to odor control are liquid-phase treatment and vapor-phase treatment. Liquid-phase treatment involves adding chemicals, such as iron salts or nitrate, to treat the sulfide in the liquid before it is emitted. Vapor-phase treatment involves the capture and treatment of odors, primarily hydrogen sulfide ( $H_2S$ ), after it is emitted. Although liquid-phase treatment reduces odorous emissions, in locations of high turbulence, such as drop shafts, it may not provide acceptable odor control. Therefore, vapor-phase treatment typically is preferred. The main vapor-phase odor control technologies used for wastewater applications include wet scrubbers, activated carbon and biological treatment.

### Wet Scrubbers

Wet scrubbers provide high efficiency treatment of  $H_2S$  odors. However, wet scrubbers demand considerable operator attention and require the use of hazardous chemicals. Double-walled storage tanks are needed for the hazardous chemicals that would need to be stored near the Fall Creek or White River. The storage of hazardous chemicals requires additional permitting and regulatory compliance and may pose some risk to personnel or adjacent communities. In addition, provisions must be made to receive tank truck deliveries of the chemicals. Due to these limitations, wet scrubbers are not ideal for the tunnel system and are not recommended.

### Activated Carbon

Activated carbon removes odorous compounds from the air through surface adhesion. The highly porous structure of the carbon supplies a large surface area per unit volume. Systems may consist of stainless steel, fiberglass reinforced plastic (FRP), or polyvinyl chloride (PVC) vessels containing either a single-bed or dual-bed of granular activated carbon.

Activated carbon provides high efficiency treatment without chemicals and requires minimal operator attention. The main disadvantage of activated carbon is that

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frequent media replacement is needed for high  $H_2S$  levels. However, activated carbon is a good choice for drop shafts because both passive and active systems can be used. Passive and active systems are relatively small in size and reliable.

Passive and active ventilation are being considered for the drop shafts. Passive ventilation systems allow air to pass through a treatment device under natural forces. Active ventilation systems use a fan to continuously vent air through the treatment system. Passive systems are desirable for the new drop shafts because a fan is not required and they are simpler to operate. Passive systems also are less expensive because of the low capital cost and no power requirement. However, passive systems have some disadvantages. High  $H_2S$  levels within the drop shaft could pose a concern for personnel safety and lead to internal corrosion of the drop shaft as it would never be vented completely. It is good practice to reduce the corrosion potential where protective coatings are used, as their degradation occurs over time.

For  $H_2S$  values between 5-10 parts per million (ppm), activated carbon is considered to be the best choice for odor control because of its reliability and compact footprint. A typical 1,000 cubic feet per minute (cfm) single-bed carbon unit is only 5 feet in diameter while a 2,000 cfm unit is 7 feet in diameter. For this tunnel system application, the compact size is desirable because most of the drop shaft sites are located in parks or near residences. In addition, activated carbon typically provides reliable odor reduction compared with other vapor-phase treatment technologies. However, a detailed study is required during design to determine the liquid-phase and vapor-phase odor control potential of the existing CSOs near the proposed drop shaft locations.

### Biological Treatment

Biological treatment can be accomplished with biofilters. Biofiltration is a biological process using soil, compost or other media as a substrate for microorganisms that remove odorous contaminants from an air stream as it travels through the media. The main disadvantages of biofilters are their large size and slightly lower treatment efficiency of  $H_2S$ . Although additional analysis would need to be completed during a

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subsequent project phase, it does not seem likely that biofiltration will be the recommended odor control technology for the tunnel project.

### **8.5 ENVIRONMENTAL IMPACT CONSIDERATIONS**

#### **8.5.1 Phase I Environmental Assessment**

A limited Phase I Environmental Site Assessment (ESA) was completed for the project corridor to identify areas that may pose a risk to locating the tunnel alignment, drop shafts, working shafts, or other necessary surface facilities in areas that may contain recognized hazardous, toxic or radioactive waste (HTRW) conditions. Phase I ESAs were completed for all drop, retrieval, and working shaft sites and the tunnel alignment corridor proposed in this report. The Phase I ESA included an environmental database review that identified 252 potential recognized environmental conditions (REC) sites within the general area of the tunnel corridor. Particular concern was given to sites identified in the vicinity of the proposed shaft locations. Other potential REC sites identified in the environmental database report or the DPW Office of Environmental Services (OES) files that were not located in the immediate vicinity of any proposed shaft locations, but may have adversely impacted environmental conditions, also were evaluated. A site reconnaissance was performed to observe project corridor conditions and indications of impacts or potential impacts to the environment. Interviews were conducted with local government officials familiar with environmental conditions of the project corridor in an attempt to gain further information on the presence of any REC in the project area. The Phase I ESA Report is presented in Appendix D – Phase I Environmental Site Assessment Report.

As the Phase I ESA revealed many REC sites within the project area, it is recommended that Phase II Environmental Site Investigations be conducted at all proposed shaft locations, and during the geotechnical exploration program. Since some shaft locations were likely to display a higher likelihood of possessing REC than other sites, a priority ranking system was established for each proposed shaft location. Drop shafts (DS) DS-04, DS-05, DS-08, DS-09,

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DS-12, DS-13, DS-14, DS-15, DS-16, DS-18 and DS-20 were assigned a low REC priority. Although assigned a low priority, these locations should receive, at a minimum, heavy field screening for REC in their immediate vicinity. Drop shafts DS-02, DS-03, DS-11 and DS-19, the working and retrieval shaft alternatives, and the Future Interplant Connection Structure were assigned a moderate REC priority. These should receive more detailed scrutiny, including subsurface investigations for potential REC concerns identified in the ESA. Drop shafts DS-01, DS-06, DS-07, DS-10, DS-17 and DS-21 were assigned a high REC priority and should receive the greatest level of scrutiny in future investigations, including detailed subsurface investigations for potential REC concerns identified in the ESA. Additionally, Worker Health and Safety Environmental Assessments should be performed at each proposed shaft location to ensure a safe working environment for construction personnel.

### **8.5.2 Management of Contaminated Soils and Groundwater**

The Indiana Department of Environmental Management (IDEM) has been authorized by the U.S. Environmental Protection Agency (EPA) to implement most of the Federal Resource Conservation and Recovery Act (RCRA) Subtitle C hazardous waste management program in Indiana. The Indiana Administrative Code (IAC) regulates hazardous waste management in 329 IAC 3.1. Indiana has adopted most of the federal hazardous waste management standards from the Code of Federal Regulations (CFR) in 40 CFR Parts 260-270 and 273. Exceptions and additions to the federal rules are noted specifically in Indiana's hazardous waste management rules. Consequently, all issues regarding the handling and disposal of contaminated soils and groundwater resulting from project operations should be coordinated with IDEM.

Prior to initiation of any subsurface investigations, a Sampling and Analysis Plan (SAP) should be completed for each proposed site. The SAPs should be coordinated with IDEM to ensure proper procedures for the handling, testing and disposal of contaminated soils and groundwater are followed. The handling and disposal of all contaminated products generated through subsurface investigations

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should be addressed specifically in the SAPs. If contaminated soils or groundwater is encountered during construction, there will likely be a construction delay and possibly increased costs to limit exposure to and mitigate the contamination.

IDEM guidelines for the handling of hazardous waste products state that recycling of waste is preferred to treatment and disposal. IDEM's Office of Land Quality and the Office of Pollution Prevention and Technical Assistance are jointly responsible for pollution prevention, waste minimization and recycling. In the event that significant quantities of contaminated soils and/or groundwater are to be removed in conjunction with project operations, activities should be coordinated with these offices.

### **8.6 PROPOSED EASEMENT AND ACQUISITION PLAN**

#### Deep Underground Construction Easement

Permanent subterranean easements are necessary along the entire main tunnel and connection tunnel alignments. The number and size of the easements will depend on the diameter of the main tunnel. The width of the tunnel easement is expected to be 50 to 70 feet depending on the required level of CSO control. A 50-foot wide underground easement has been assumed for a 26-foot finished diameter main tunnel. Each connection tunnel will require a subterranean easement with a maximum width of 40 feet. If public property is not easily accessible, additional temporary easements may be necessary along the tunnel alignment for concrete drops during lining operations. However, this would need to be evaluated more during future design phases as it may be possible that the final drop shaft locations could be sufficient to drop the concrete needed for lining operations. Property will be purchased, if not currently owned by the City. Property ownership information for each parcel along the proposed alignments and the easement requirements are presented in Appendix E – Property Owners/Easement Requirements for Main Tunnel. Table 8.1 summarizes the anticipated number of non-public rights-of-way required for each tunnel alignment.

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Table 8.1 Non-Public Rights-of-Way Required for Tunnel Construction <sup>1</sup>	
Tunnel Alignment	Number of Non-public Rights-of-Way Required <sup>2</sup>
West	112
Central	146
East	125
<sup>1</sup> Assumes a 50-foot wide easement is required.	
<sup>2</sup> Number of properties listed are for the subterranean easements necessary to construct the main tunnel.	

### Property Acquisition

Land should be acquired for each shaft and consolidation sewer location. Properties to be purchased along the proposed alignments are presented in Appendix E – Property Owners/Easement Requirements for Main Tunnel. Property Owners presented in Appendix E include the subterranean easements and the easements/property required for consolidation sewer and shaft construction. The boundaries of impacted properties are presented in Appendix C – Consolidation Sewer and Drop Shaft Location Plans.

### 8.7 PERMITS

Various permitting requirements need to be considered during the design phase for the construction of the Fall Creek/White River Tunnel and Flow Augmentation System projects. All local, state and federal regulations will be reviewed during future design phases to ensure all permits are obtained prior to construction. A preliminary list of likely regulatory and private agencies and their required permits for this project are presented below. The list below may not be complete and should be updated during subsequent design phases.

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### U.S. Army Corps of Engineers

- ◆ Section 404 of the Clean Water Act Permit – Discharge of dredged or fill material into navigable waters

### Indiana Department of Natural Resources

- ◆ Indiana Code IC-14-28-1 Flood Control Act Permit – Non-residential construction at surface structure locations within wetlands
- ◆ Dewatering permit required for the installation of wells that withdraw more than 100,000 gallons per day (singly or in aggregate)

### Indiana Department of Environmental Management

- ◆ Rule 5 Notice of Intent Letter Form – National Pollutant Discharge Elimination System (NPDES) General Permit Rule for storm water discharges associated with construction activity. An NPDES permit will also be required for the effluent force main discharge into Fall Creek, Pogues Run and Pleasant Run. In addition, the Marion County Soil and Water Conservation District would provide review of storm water applications for this construction project.
- ◆ Sewer construction permit
- ◆ Section 401 Water Quality Certification – Discharge of dredged or fill materials to water of the State and State isolated wetlands

### Indiana Department of Transportation

- ◆ Permits to haul oversize and/or overweight loads on U.S. and state highways
- ◆ Permits for highway crossings or potential borings under roadways

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### City of Indianapolis/Marion County

- ◆ Permit or approval for construction of a tunnel system and attachment to a City sewer line
- ◆ Permit or approval to cut a City curb to gain access to a street or road
- ◆ Permit or approval to work in City's right-of-way
- ◆ Permit for demolition, wrecking and/or removal of a structure
- ◆ Flora Permit from the Indianapolis Parks Department
- ◆ Permit or approval to discharge contaminated ground water to AWT (if needed)
- ◆ Zoning ordinance amendments or special district approvals, as may be required
- ◆ Improvement Location Permit from Indianapolis Department of Metropolitan Development (DMD). As part of the review and approval of this permit, the Wellfield Protection Ordinance requires written approval of proposed improvements within the City's wellfields by the technically qualified person

### Railroad

- ◆ Railroad crossing permits need to be acquired for the project. There are two force main crossings for the flow augmentation system that will require being constructed according to the railroad requirements to receive the permit. The consolidation sewers should not be impacted by the requirements. Depending on the selected tunnel alignment, five or six segments of railroad property will require an underground (tunnel) easement. Tunnel construction is not anticipated to impact the use of the railroad at any time.

### **8.8 CONTRACTING GOALS**

There are several contracting goals that can influence the number of construction contracts.

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### Simplify Administration

Given the inherent complexity of this project, the first goal is to streamline project administration and minimize administrative costs.

### Obtain Competitive Pricing

The second goal is to take advantage of pricing factors that are inherent to a competitive marketplace. This could be achieved by using bidding strategies and specification requirements that encourage competition between suppliers of similar products and services.

### Optimize Construction Management Costs

The third goal is to balance the cost of construction management services with the number of construction contracts. The elements of construction management include, but are not limited to, contract administration, construction inspection, scheduling, processing payment requests and document tracking.

As the size of a construction contract increases, the cost of construction inspection will increase proportionally. Management, administration and document tracking is often more cost effective on a unit basis for larger projects. Therefore, it is expected that the cost of construction management will be less as a percentage of the construction cost for a single large contract versus several smaller contracts.

### Minimize Risk Associated with Multiple Construction Contract Interfaces

The fourth goal is to minimize contractor claims for changes in contract price and contract time relating to the interfaces between multiple construction contracts. This risk is usually the result of one contractor delaying the activities of another. This goal could be achieved by minimizing the number of contracts or by building contingencies into each contract to account for potential interface problems.

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### Include Local, Small Firms and/or Contractors

A fifth goal should be to limit the size of certain construction contracts in order to allow local, smaller and disadvantaged firms and/or contractors to participate in the project.

### Include MBE/WBE Firms and/or Contractors

A sixth goal should be to encourage and allow Minority Based and Women Based Enterprises (MBE/WBE) to participate in the project. MBE and WBE participation is important to the overall development and stability of the Indianapolis economy.

### **8.9 TUNNEL OPERATION AND MAINTENANCE**

Operation and maintenance (O&M) for the Fall Creek/White River Tunnel system will consist of the activities indicated below, and as determined during future project design phases.

- ◆ Inspection and removal of debris at the screening facilities following each significant use
- ◆ Inspect the main and connecting tunnels every 10 years for lining performance
- ◆ Clean out the main tunnel every 10 years with appropriate equipment, if necessary
- ◆ Inspect gates and mechanical components of the regulators and drop structures annually; repair and replace as required
- ◆ Exercise and inspect pump station according to specifications
- ◆ Develop groundwater protection and install monitoring wells for periodic monitoring of groundwater levels and quality
- ◆ Replace activated carbon odor control panels at the recommended frequency

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### **8.10 TUNNEL LINING/CONCRETE DELIVERY OPTIONS**

The delivery and use of concrete is an important component of shaft construction and tunnel lining operations. Shaft locations will be used to drop concrete to various tunnel segments to complete the lining operation in an efficient manner. The shafts and shaft base de-aeration chambers will also be constructed using concrete delivered to the site. Concrete can be delivered by truck to various shaft sites, but a temporary onsite batch plant may be desirable at key locations on the tunnel alignment, such as the primary working shaft and retrieval shaft sites. Additional study should be performed during later project design phases to determine the most cost effective delivery method for concrete. In addition, the selected contractor(s) for the project may suggest alternative concrete delivery methods to efficiently perform the work. However, strict measures should be in place to ensure that a consistent, high-quality concrete mix is delivered throughout the construction duration.